CASE FOR VANASPATI

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the Case for Vanaspati

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FOREWORD

Vanaspati is nowadays in the news. An attempt has been made in this booklet to examine every possible aspect of the controversy in an objective and a matter-of-fact way. We are confident that the reader who approaches it without preconceived notions or prejudices will find in it sufficient evidence to convince him of the great value of this important food industry to the dietary of the people and to the country as a whole.

The Vanaspati Manufacturers' Association of India.

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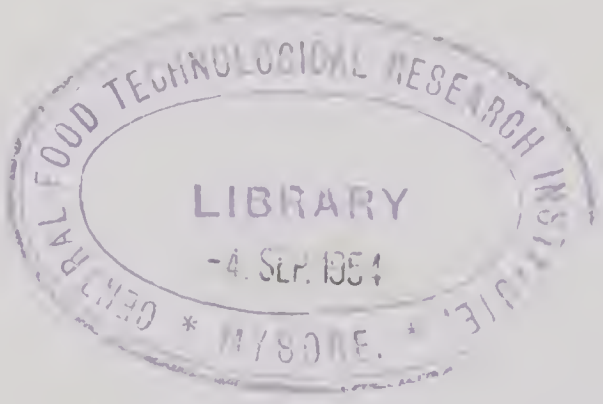

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THE CASE FOR VANASPATI

It is not clear how the term "Vanaspati" — or for that matter the equally popular term "Vegetable Product" — originated. The purpose of those who gave it currency however is fairly obvious: it was to emphasise the vegetable origin of the product as opposed to the animal origin of its more familiar counterpart: Ghee. Thanks to its popularisation by the Vanaspati Industry the term today is well understood throughout the length and breadth of the country; it no longer requires the additional designation of "ghee" to convey its meaning. Indeed, the Industry as such does not look with favour upon the association of the word "ghee" with Vanaspati; this is partly due to its anxiety to sell its product on its own merits — and there is a lot in a name! — and partly to a desire to avoid conflict with certain Provincial Food Laws, a strict interpretation of which would rule out the sub-qualification of "ghee" for describing Vanaspati.

WHAT IS VANASPATI?

But if the term "Vanaspati" is almost universally understood in India, there is in general no clear conception as yet of what Vanaspati is. Vanaspati is ordinary vegetable oil such as has been used for centuries in millions of India's household kitchens. The only difference between Vanaspati and vegetable oil is that Vanaspati is refined (i.e. freed of the slime, the free fatty acids and the colour of the oil), hydrogenated (i.e. hardened), so that in appearance and in physical properties it bears close resemblance to ghee, and then deodorised to rid it of unattractive odour and taste.

BRIEF OUTLINE OF INDUSTRY'S DEVELOPMENT:

Though Vanaspati is, in a sense, a product of India — in the same sense as Ghee is peculiarly Indian — its production was not begun in India. It was initially imported from Europe after the end of the first World War, where Margarine — a twin product — was already popular as an alternative to butter. Vanaspati came to India principally from Holland. Production in India started on a small scale in 1930, but by 1933, owing to a comparatively high rate of duty, imports fell to a very negligible level. The following table gives a fairly accurate estimate of the Industry's development in India since 1935:

Year	Sales in India in Tons
1935	18,000
1936	22,000
1937	32,000
1938	40,000
1939	51,000
1940	65,000
1941	84,000
1942	71,000
1943	87,000
1944	1,03,000
1945	1,34,000
1946	1,37,000

It will be seen that but for 1942, when the impact of Japan's entry into the war was felt most acutely in India, there has been a remarkable increase in the sale and popularity of Vanaspati from year to year. *In less than 5 years sales over 1935 were trebled, while in 10 years the increase in sales was more than sevenfold.*

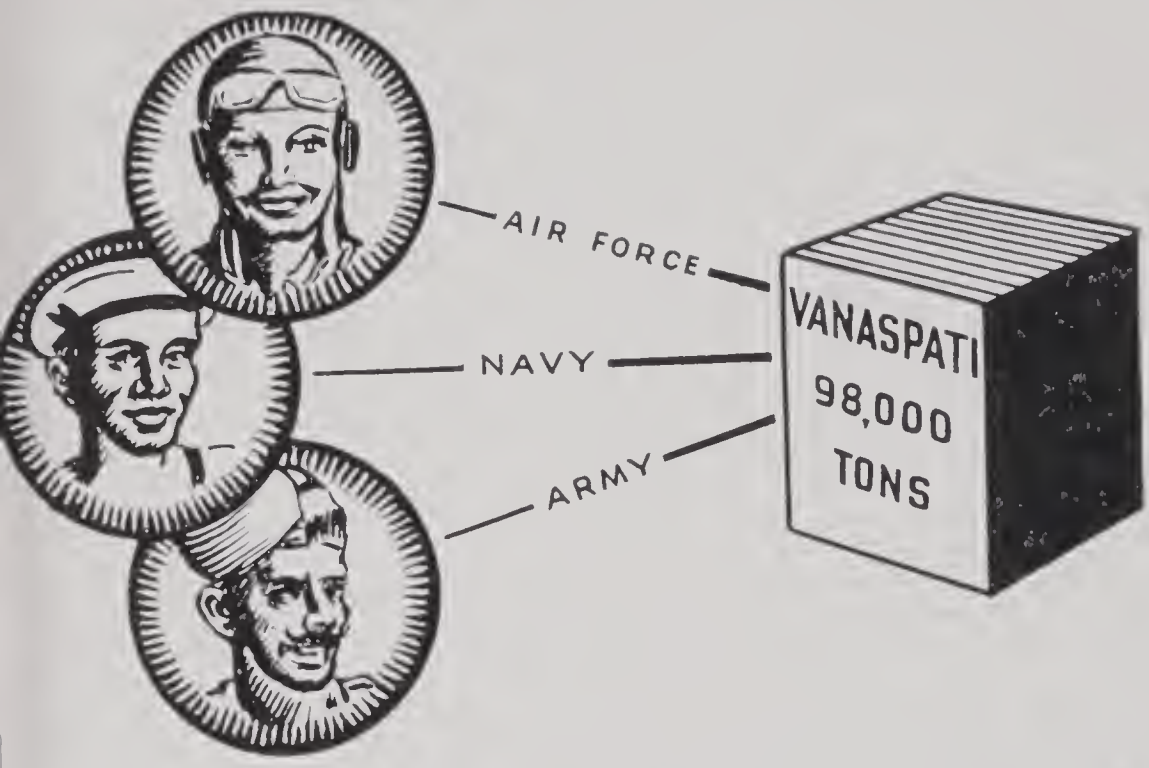
Not all the Vanaspati marketed during the later years of the war, however, was consumed by the general public. In 1943, partly in recognition of the food value of Vanaspati and partly as a result of the increasing shortage of ghee, the Government of India entered the market as the largest single purchaser of Vanaspati on behalf of the Defence Services. The following table gives a fairly reliable estimate of Government's purchases of Vanaspati from the Industry:

Year	Tons
1943	23,000
1944	33,000
1945	30,500
1946	11,500
	98,000

While the increasing demand from the Defence Services up to the end of the war was largely due to the issue of a Vanaspati ration to the army on five days a week instead of on two days a week, the decline in demand is solely attributable to the rapid demobilisation of the army as the army ration of Vanaspati after the war continued to be on the basis of five days a week.

Remarkable as the progress of the Industry may appear to be in the light of the above statistical data, it should be emphasised that sales since the war years give no indication of the extent of demand for Vanaspati, as the possibilities of expansion were — and still are—very severely restricted, mainly by lack of plant.

It may, of course, be argued that the war, especially the demand



ALL THE ARMED FORCES ARE FED ON VANASPATI

from the armed forces, accentuated the demand. This is no doubt an important consideration, but a cursory examination of the position without taking the demand from the Defence Services into account would be no less revealing. Sales of Vanaspati to the civil market since 1943 were as follows:

Year	Tons
1943	64,000
1944	70,000
1945	1,03,500
1946	1,25,500

It will be seen that within three years sales of Vanaspati to the civil market were — and that too despite rising prices — almost doubled. This is indeed a significant testimony to the enormous popularity that Vanaspati has acquired with the consuming public. It was no doubt this factor more than any other factor which had prompted the Government of India in 1945 to sanction, with the subsequent approval of a Special Advisory Committee, a compromise preliminary expansion of the Industry's capacity up to approximately 4,50,000 tons by 1950. This represents an increase of approximately 150% over the *potential* capacity available today.

THE JUSTIFICATION FOR THE VANASPATI INDUSTRY :

Because Vanaspati is made to resemble ghee it has been stigma-

tised as a false coin. The stigma is difficult to understand, for *Vanaspati is no more a false coin when compared to ghee than Rayon is when compared to silk.* One is not produced to be passed off for the other; there is demand for both. And there is demand for both ghee and Vanaspati because, in the first place, there is not enough ghee in the country to meet the requirements of the population — which is growing at the rate of 50 lakhs per year — and, in the second place, because the price of ghee — whether under pre-war conditions or today — is well beyond the economic reach of the greater part of the population.

But, in estimating the merits or demerits of Vanaspati, the real criterion is obviously whether Vanaspati offers important advantages over the vegetable oils from which it is prepared. Some critics of Vanaspati readily concede its advantages over crude oil, but they seem to question the desirability of hydrogenation after the oil has been refined. There are at least five considerations in favour of Vanaspati as compared with refined oil.

(i) Vanaspati keeps fresh in smell and taste for much longer periods than refined oil and is less prone to rancidity. This is a major consideration in a largely tropical country like India.

(ii) The ghee-like appearance of Vanaspati makes it more attractive and therefore more palatable to the consumer. For an article of food this is of considerable importance.

(iii) The firmer consistency of Vanaspati makes it less prone to leakage in transit. This may at first sight appear to be a small advantage, but it is in fact an important economic factor in a large country like India, where transport conditions are unfavourable, particularly as edible oil is relatively one of the most expensive articles of daily food.

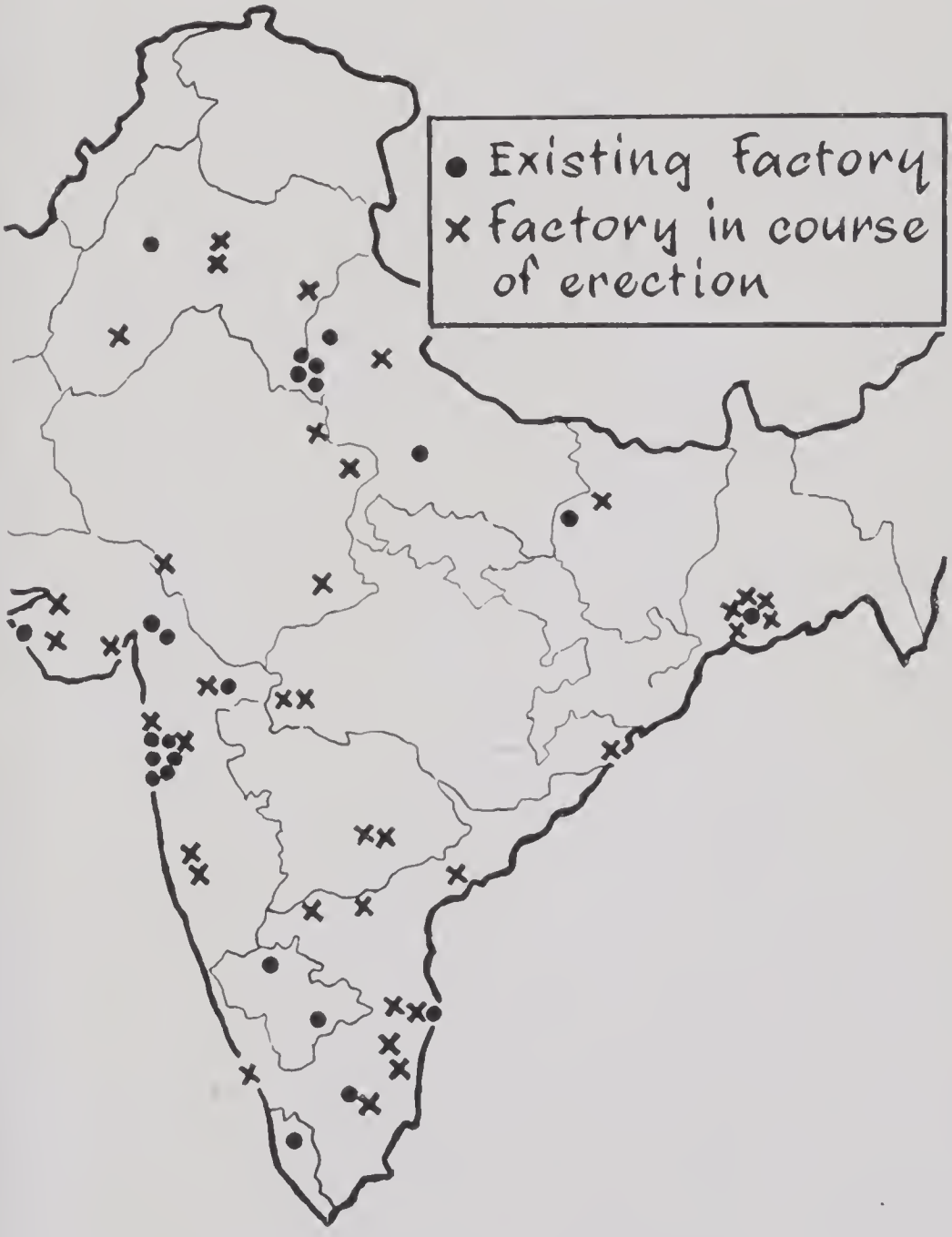
(iv) Because of the vast size of the country a large variety of edible oilseeds, depending on climate and soil, is grown in India. This has conditioned the taste of the people to different edible oils. It is well known, for instance, that the Bengalis prefer mustard oil, while the people of the Malabar Coast set great store by coconut oil. Vanaspati by its very nature and appeal has cut across local prejudices and become acceptable in all parts of the country in the same way as ghee. This enables the fat resources of the country to be distributed on a more rational basis.

(v) The last but not the least consideration in favour of Vanaspati is that people like it. This fact admits of no argument; the astonishing increase in the sale of Vanaspati is the best proof of its popularity.

All these advantages are of great importance in a country like ours, where the nutritional standards are low, the climate is unfavourable to the keepability of oils, distances are vast and the opportunities for a palatable diet are almost unknown to a large section of the population.

PART PLAYED BY THE VANASPATI INDUSTRY IN THE NATIONAL ECONOMY:

But the contribution of the Vanaspati Industry does not only rest on the improvements of the main fat resources of the people. Next to the sugar industry — whose "utility" versus gur is, incidentally, also questioned by the protagonists of crude oil against Vanaspati — the Vanaspati Industry is the largest processed food enterprise in the country. Over twenty crores of rupees have, according to the Hon'ble Food Member, already been invested in it. The Industry employs, directly, several thousands of workers and is respon-



sible, indirectly, for the employment of several thousand additional workers in ancillary industries, which supply the Vanaspati Industry. Its by-products are used in the manufacture of soap, glycerine, certain pharmaceutical preparations and a number of other articles, some of which help to make India self-sufficient in them and others less dependent on other countries for them.

Nor should the contribution of the Vanaspati Industry to the agricultural wealth of the country be ignored. *It is clear that, to meet the growing demand of the Industry for vegetable oil, the incentive to grow more oilseeds will increase from year to year.* Such a development would indeed be in keeping with the recommendations of many experts, including Mr. Afzal Husain, who, in the Final Report of the Famine Enquiry Commission, recommended that the existing acreage under oilseeds should at least be doubled.

It is also clear that, with the growing demand of the Vanaspati Industry for vegetable oil, the seed grower will be increasingly freed from any dependence on exports. Such a development will not only encourage the local oil-crushing industry but, through the increased availability of oilcake, will also serve to augment the country's extremely limited resources of cattle-food as well as manure.

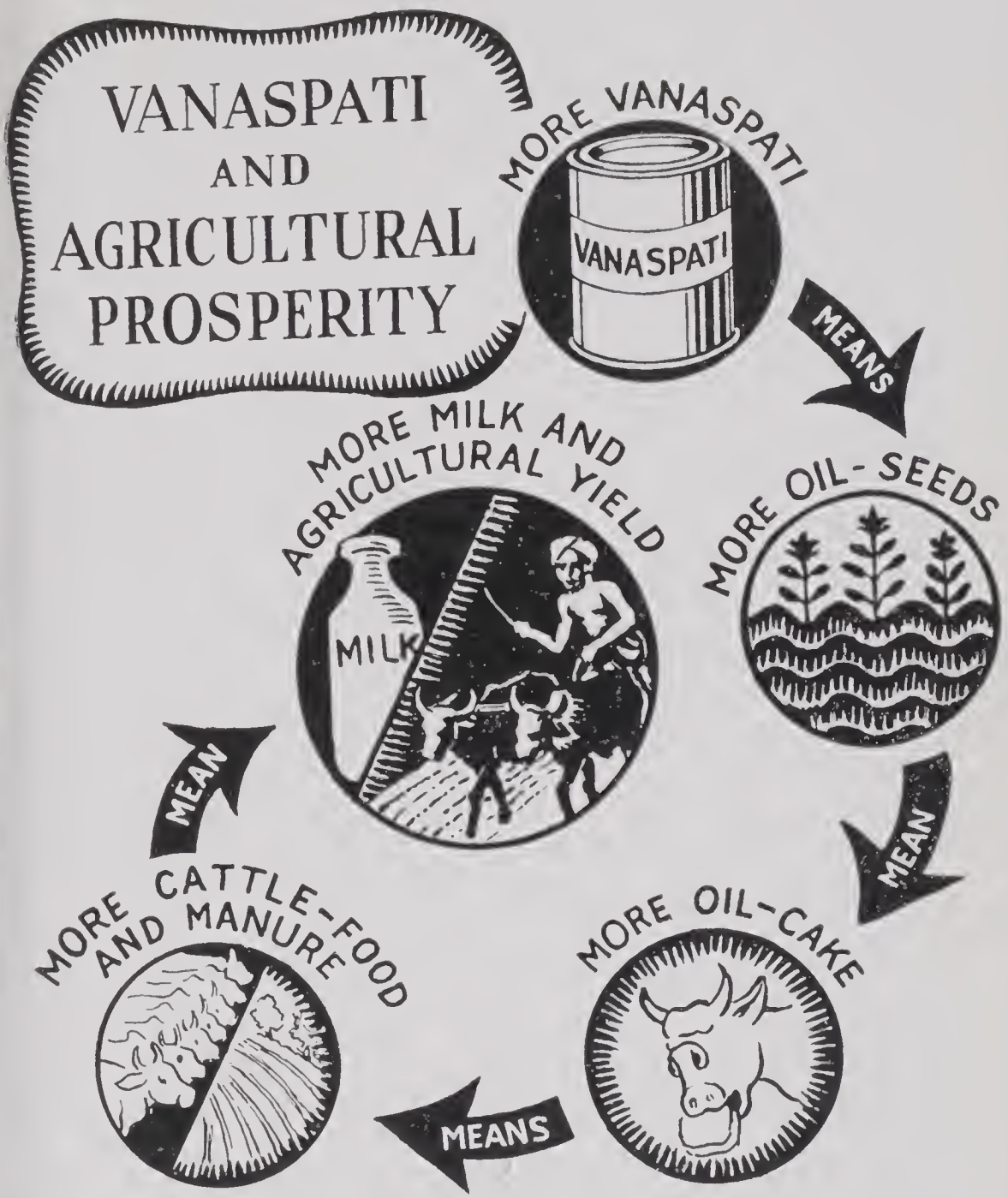
Briefly: more Vanaspati means more oilseeds, more oilseeds mean more oilcake, more oilcake means more cattle-food and more manure, more cattle-food and more manure mean more milk and better agricultural yield. A simple and logical sequence which adds considerably to the agricultural wealth of the country.

WILL ENCOURAGEMENT OF VANASPATI AFFECT GHEE?

But valuable as the Vanaspati Industry is, it is clear that, from the viewpoint of national economy, its development should not be allowed to retard the prospects of the ghee industry.

Some critics of Vanaspati are apprehensive that the development of the Vanaspati Industry might affect the progress of the ghee industry. It is argued that, if Vanaspati were to injure the ghee industry, the income derived from rearing cattle would go down and the rearing of cattle would become more difficult. If this were true, the effect on the agricultural economy of the country would no doubt be serious.

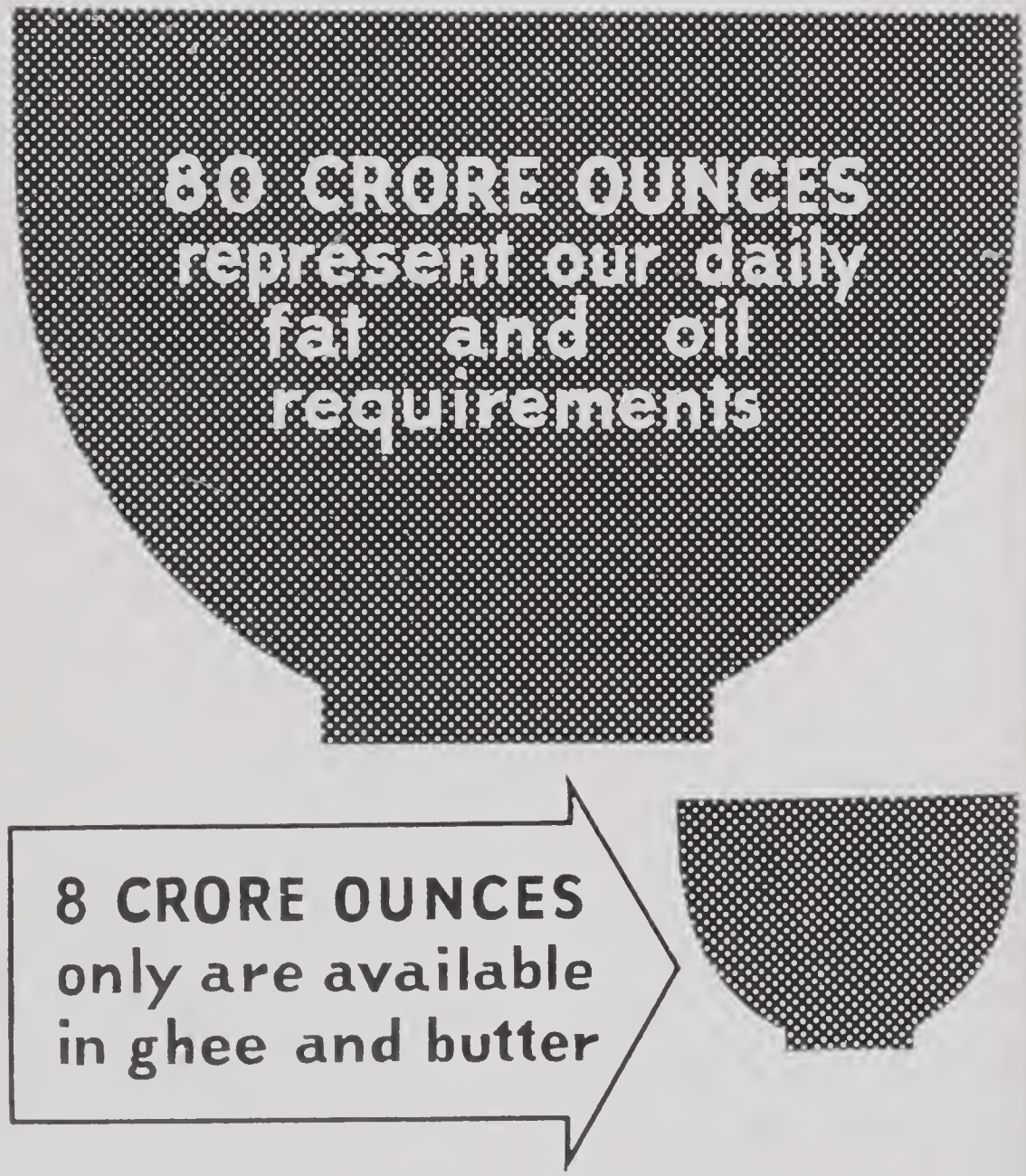
The point however is whether Vanaspati does adversely affect the ghee industry. Fortunately, if all the relevant factors are taken into account, it will be seen that *the development of Vanaspati cannot affect the progress of ghee adversely.* This is evident from a cursory glance at the oil and fat position in India. While accurate statistics are not available, the edible oil and fat resources of the country have, in round figures, been estimated today as follows:



	Tons	%	
Ghee and Butter	7,00,000	35.0	42.5
Vanaspati	1,50,000	7.5	
Vegetable Oil	11,50,000	57.5	
	20,00,000	100.0	

These figures exclude exports which until recently were, as far as edible oilseeds are concerned, considerable. Nevertheless, on the basis of a population of 40 crores, the total oil and fat resources available for edible purposes in India today provide for a per-capita consumption of only 11.2 lbs. per year or approximately $\frac{1}{2}$

oz. per day. Considering that the desirable nutritional minimum of oil and fat consumption for India is, according to the Nutrition Advisory Committee of the Indian Research Fund Association, as much as 45½ lbs. per head per year or 2 oz. per head per day, it is obvious that the prospects of achieving the desirable minimum, after allowing for the estimated growth of population at the rate of 50 lakhs per year, are remote indeed, at least for many years to come. However, it is hoped that under a national Government the present low per-capita consumption of oil and fat in India may be doubled by 1960, that is to say, raised to 22.4 lbs. per head per annum. To achieve such a modest ideal — which is less than half the desirable minimum — the oil and fat resources of the country would have by 1960 to be stepped up from 20,00,000 tons to 46,50,000 tons.



Now there can be no question as to the popularity of fats as opposed to oils in India. Not less than 42.5% of the oil and fat resources of the country today are, as we have just seen, available in the form of fat, that is, in the form of ghee, butter and Vanaspati. *There is every reason to believe that this ratio would be higher if supplies were available. There is also every reason to believe that with a higher standard of living the demand for fat as opposed to oil will increase.* However, assuming that the present ratio would be maintained by 1960, the oil and fat resources of the country will have to be met as follows:

	Tons	%
Fat	19,76,250	42.5
Oils	26,73,750	57.5
	46,50,000	100.0

The question to consider is to what extent will it be possible or desirable to supply the demand for fats in the form of dairy products like ghee or butter. Obviously this is not an easy question to answer. However, two important factors have to be taken into account: (1) *That in spite of the fact that approximately ⅓ of the cattle population of the world is to be found in India, the production of milk in India is, in relation to the population — both human and cattle — extremely limited.* (2) *That the problem of improving the yield of cattle in India, which is dependent on the improvement of breed, fodder resources etc., is, in the words of the Hon'ble Dr. Rajendra Prasad* (vide his speech at the opening of the 6th All-India Cattle Show at Delhi on the 10th of February 1947), *"a tremendous task" and, what is more, "bound to be a slow process".*

From the nutritional point of view it is generally admitted that it is more important to increase the per-capita consumption of fluid milk rather than the consumption of milk products, so that in the interest of the health of the nation any increase in yield resulting from improvement in the dairy industry should in the first instance be devoted to consumption as fluid milk. However, taking a most optimistic view of the future of the dairy industry it will be a remarkable achievement indeed, if the anticipated doubling of the oil and fat resources of the country by 1960 will result in the stepping up of the present production of ghee by 40%, i.e. from 7,00,000 tons to approximately 10,00,000 tons.

If this target for ghee should be achieved, there would still be required approximately another 10,00,000 tons of Vanaspati to maintain the existing ratio between the consumption of fats and oils in India. In other words, *even after allowing the Vanaspati Industry's capacity to be increased to 4,50,000 tons by 1950, there would still be ample room for doubling the capacity of the Vanaspati Industry between 1950 and 1960 without even remotely affecting the prospects of ghee.* It is therefore clear that the development of the Vanaspati Industry will not injure the ghee

industry, just as the development of the Margarine Industry elsewhere did not injure the prospects of the Butter Industry.

THE PROBLEM OF ADULTERATION:

One of the main arguments advanced against the encouragement of the Vanaspati Industry — and this argument is significantly enough now losing ground to a yet more controversial argument which we shall examine later — is that Vanaspati tends to increase the adulteration of ghee. That Vanaspati can be, and is sometimes, used as an adulterant of ghee is admitted. So, to take an extreme example, is water used for the adulteration of milk. But clearly Vanaspati is not the only adulterant of ghee. *There can be no question but that ghee had been adulterated in India before the advent of Vanaspati. Nor indeed is Vanaspati the main adulterant.* Crude vegetable oil and animal tallow have been, and continue to be, by far the most extensively used adulterants of ghee.* This is not an exaggeration: a juxta-position of the figures of sales of ghee and Vanaspati in India would clearly show how insignificant is the part that Vanaspati could have so far played in the adulteration of ghee.

Before the war, for instance, when the threat of adulteration of ghee by Vanaspati was trumpeted more stridently than today, the potential adulteration of ghee by Vanaspati — on the fantastic assumption that all the Vanaspati sold in India was used for adulterating ghee — could only have been $2\frac{1}{2}\%$ in 1935 and $7\frac{1}{4}\%$ in 1939.

Today with about one-fourth of the Vanaspati Industry's output sold direct to the consumer in small sealed containers — this percentage would have been higher if adequate supplies of tinplate were available — and with tens of thousands of tons retailed in small quantities from large containers from nearly 50,000 dealers of Vanaspati throughout the country (not to speak of the appreciable quantities consumed by biscuit manufacturers, bakers, confectioners and other non-domestic users), it would be more than phantasy to contemplate the theoretical possibility of the total output of Vanaspati being used for adulteration. But even if one were to fly perversely in the face of all the facts and to assume such a highly hypothetical possibility, the extent of potential adulteration of ghee by Vanaspati today would still be limited.

*"Since the demand for ghee, ... is greater than the supply, the practice of adulterating it with vegetable fats derived from cottonseed, poppyseed, groundnut, mahua and other similar inexpensive oils is extremely common. It is interesting to note here that adulteration is usually effected, not by the dairymen, but by the traders. Some of them do not even hesitate to use fats obtained from the carcases of diseased and dead animals!"—Dr. N. Gangulee in 'Health & Nutrition in India' (1938).

But the reason why other adulterants of ghee are overlooked and attention is, instead, concentrated on Vanaspati seems to be because, unlike vegetable oils and animal fats for instance, Vanaspati as a factory-produced article is easier to control. This is, of course, as illogical an attitude as it is shortsighted, because as adulterants crude vegetable oils and animal fats are most undesirable and, as far as animal fats are concerned, offensive to the religious susceptibilities of a large section of the population as well. This is not an apology for the use of Vanaspati as an adulterant of ghee. Nor is it intended to be. The Vanaspati Industry is, in its own interest primarily, keenly interested in the prevention of adulteration of ghee by Vanaspati. Indeed the Vanaspati Industry is equally anxious that Vanaspati itself shall not be adulterated. That is why in its fairly extensive advertising campaign the merits of Vanaspati as Vanaspati are emphasised and the appeal is made direct to the genuine consumer. No one who is familiar with the progress of the Industry today can deny that this appeal has gone home and that by far the greater part of the Vanaspati sold throughout the country is sold as Vanaspati and in no other guise.

Nevertheless because of the considerable price difference between ghee and Vanaspati — the price of Vanaspati is generally one-third of the price of ghee — the incentive to use Vanaspati as an adulterant will remain a factor, so long as the unscrupulous dealer is not checked in his antisocial activities and so long as public opinion is tolerant of such activities. Rules for the prevention of adulteration of foodstuffs exist in all Provinces and States in India. The problem however is essentially not one of framing rules but one of enforcing them. But what Government may legitimately be expected to do, apart from enforcing the law, is to draw up suitable and practicable measures for the protection of each and every article of food.

From the statutory point of view, ghee is perhaps better protected than any other article of food in India. All the Provincial and State Governments have far-reaching powers for regulating the sale of ghee and ghee alternatives. As far as Vanaspati is concerned, the Government of India have during the last three years taken wide powers, under emergency regulations, to control its production and distribution on an all-India basis.

For example, it is now necessary under the Vegetable Oil Products Control Order to manufacture Vanaspati only to a certain approved specification.

It is also incumbent on the Industry to mark and identify Vanaspati containers in a manner that the consumer may be left in no doubt as to what the container contains.

Moreover, it is made an offence for a stockist of Vanaspati to stock or sell ghee on the same premises. (It should in fairness be added that all these regulations, and others, have long since been in

force in most Provinces).

Only recently it has been made obligatory on all Vanaspati manufacturers to incorporate a percentage of Sesame Oil in Vanaspati, so as to render easier the detection of ghee adulterated with Vanaspati.

The incorporation of Sesame Oil in Vanaspati follows the procedure adopted in several countries, where Margarine is produced on an extensive scale side by side with butter. *Sesame Oil, when incorporated in Vanaspati, acts as a latent colouriser and with its aid adulteration can be detected by a simple chemical test.* The test is indeed so simple that any purchaser of ghee, who is so inclined, can test for himself whether the ghee which he purchases from the bazar is adulterated with Vanaspati or not, by shaking a small part of the ghee which he is offered with an equal amount of Hydrochloric Acid and a few drops of 2% alcoholic solution of Furfurol. If the product turns pink in the solution, it is to be concluded that it is adulterated with Vanaspati. With this stipulation, which came into force from 1st March 1947, practically all the "remedial measures" for checking the adulteration of ghee with Vanaspati, advocated by Sardar Sir Dattar Singh and endorsed by Mahatma Gandhi in the *Harijan* of April 14th 1946, have been put into effect on an all-India basis.

The Vanaspati Industry welcomes the all-India application of these measures, not only as a preparatory step towards the promulgation of an all-India Model Food Act, for which it has for long been pressing, but also as an indication of the growing recognition that the way to solve the problem of adulteration of food is not to restrict one important industry so as to safeguard another, but to provide for and enforce adequate penal measures against those who practice adulteration.

THE FOOD VALUE OF VANASPATI:

But obviously the Vanaspati Industry must stand or fall by the value of Vanaspati as an article of food. *Hydrogenated Oils constitute today one of the most important processed food industries of the world.* In Europe, Margarine is already as familiar to the greater part of the population as Butter. Similarly, the Shortening Industry in the United States — which incidentally is more akin to the Vanaspati Industry than is the Margarine Industry, as Margarine is primarily used as a bread-spread whereas Vanaspati and Shortenings are used for cooking and frying — has registered remarkable progress over the last 20 to 30 years.

The food value of Hydrogenated Oils, of which Vanaspati is one variety, has already been the subject of extensive research in several parts of the world, particularly in Europe and the United States. *According to the most authoritative scientific evidence available, the energy and food value of Hydrogenated Oils, as used*

in shortening and Vanaspati, are the same as those of the original oil from which they are prepared, and as a source of fat fully equal to those of ghee and butter.

Research on Vanaspati in India has admittedly been limited so far, but in a note to the Government of India on "The Nutritional Value of Vanaspati and Animal Ghee" Dr. W. R. Aykroyd, who, until recently was the Director of Nutritional Research in India, confirmed that *"Vanaspati is a wholesome food and there is no objection, from the nutritional standpoint, to an increase in its consumption".*

This is not an arbitrary conclusion; it is in line with the views of Deuel, Langworthy, von Euler and several other eminent research workers in Europe and America, including the United States Council on Foods and Nutrition.

But although this point of view was placed before the Council of State as recently as the 11th March 1946, criticism of Vanaspati has of late tended increasingly to concentrate on attacking its food value, rather than on exaggerating its "threat" as an adulterant of ghee. This change of tactics is significant, though admittedly it is no less — if not more — dangerous. On the one hand it is no doubt calculated not to overstress an accusation, which is now demonstrably open to question, and on the other hand, to wean away a large section of the community which now consumes Vanaspati as Vanaspati and likes it. But this only proves to what length some critics are prepared to go to prop up their preconceived and irrational prejudices against Vanaspati.

POPULAR MISCONCEPTIONS ABOUT VANASPATI:

Vanaspati, as has already been pointed out, was originally imported from abroad. Suspicion against a foreign article, especially in matters of food, is natural to a certain extent. In this connection one cannot but recall how, even during the critical famine period towards the end of the late war, critics were not wanting to condemn imported wheat as being nothing short of a menace to the health of the public!

Vanaspati has long since ceased to be a foreign article and has for many years now been entirely produced in India from indigenous oils. Today it would be difficult to point to an important Indian industrial concern, which does not claim a stake in the Vanaspati Industry.

One is therefore irresistibly led to the conclusion that the reckless and ill-informed agitation against Vanaspati, which continues to emanate from certain circles today, is largely inspired by pseudo-religious sentiments; for it is only such an unnatural alliance as one between pseudo-religious sentiment and pseudo-scientific opinion

that can convert an article of food, which is considered as nutritious and wholesome in other parts of the world, into something which leads to practically all the ills that the human flesh is heir to when consumed in India.

Nevertheless, there are a few popular misconceptions about Vanaspati, arising largely from incomplete scientific evidence, which it would be desirable to examine here.

Vitamins: One of the main arguments adduced in condemnation of Vanaspati is that Vanaspati does not contain vitamins A and D. It is true that Vanaspati does not contain these vitamins unless they are especially added. But so also is the oil, from which Vanaspati is prepared, devoid of these vitamins. These two fat soluble vitamins occur in certain natural foodstuffs. Unfortunately the main source of vitamin A known today is whale or fish liver oil. In Europe and America, Margarine is fortified with vitamin A obtained from whale or fish liver oil concentrates, as such a source of vitamin does not offend the religious susceptibilities of the people. In India, however, the incorporation of vitamin A of animal origin into Vanaspati would obviously offend the susceptibilities of a great majority of the people. Incidentally, it is this fact which has led some ill-meaning critics to endeavour to prejudice consumers of Vanaspati, by alleging that it contains vitamins of animal origin. Vanaspati, as produced in India today, does not contain Vitamin A of animal origin. There are no difficulties however in adding vitamin D to Vanaspati and this is already being done by many Vanaspati manufacturers.

While, from the viewpoint of vitamin content, the correct analogy is obviously between Vanaspati and the oil from which it is produced, it should not be supposed that ghee has an overriding advantage over Vanaspati on this score. While pure cow's ghee is a good source of vitamin A, buffalo ghee from which the bulk of ghee produced in India is prepared is a considerably poorer source. N. K. De and co-workers at the Nutrition Research Laboratories, Coonoor, and Bashir Ahmad and co-workers at the Punjab University Institute of Chemistry have shown that, when ghee is used as a frying or a cooking medium, as is usually the case, its vitamin content is partly or even wholly destroyed and is therefore lost to the consumer.

In this connection it is interesting to note that, when the Government of India first decided to supply Vanaspati to the Defence Services, the question was considered whether it would not be desirable to fortify Vanaspati with vitamin A of vegetable origin. The question however was dropped, as it was proved by experiment that the vitamin was readily destroyed when Vanaspati was used for cooking and frying and it was therefore concluded that the fortification of Vanaspati with vitamin A was not worthwhile.

Dr. Aykroyd, in his note on the Nutritive Value of Vanaspati and Animal Ghee, sums up this rather controversial issue thus: "*If*

we compare ghee as actually sold and consumed with Vanaspati in respect of vitamin A content, it cannot be claimed that such ghee has any remarkable advantage over Vanaspati".

Digestibility of Vanaspati: Another popular misconception about Vanaspati is the allegation that it is less digestible than either ghee or the liquid vegetable oil from which it is prepared. There are two aspects of digestibility of an oil: the first is the proportion of the oil which is absorbed by the human system or the "digestibility co-efficient", and the second is the rate at which the oil is absorbed.

Langworthy in the U.S.A., in a classical series of experiments on human subjects, has demonstrated convincingly that the digestibility co-efficients of vegetable oils hardened up to a melting point as high as 45°C are as good as those for butter-fat and liquid vegetable oils.

Roy, working in Calcutta, has shown that Vanaspati is as completely absorbed by rats as is ghee, and that heating to the temperatures which are commonly used in domestic cooking does not significantly reduce the digestibility co-efficients of Vanaspati or the more commonly used liquid vegetable oils.

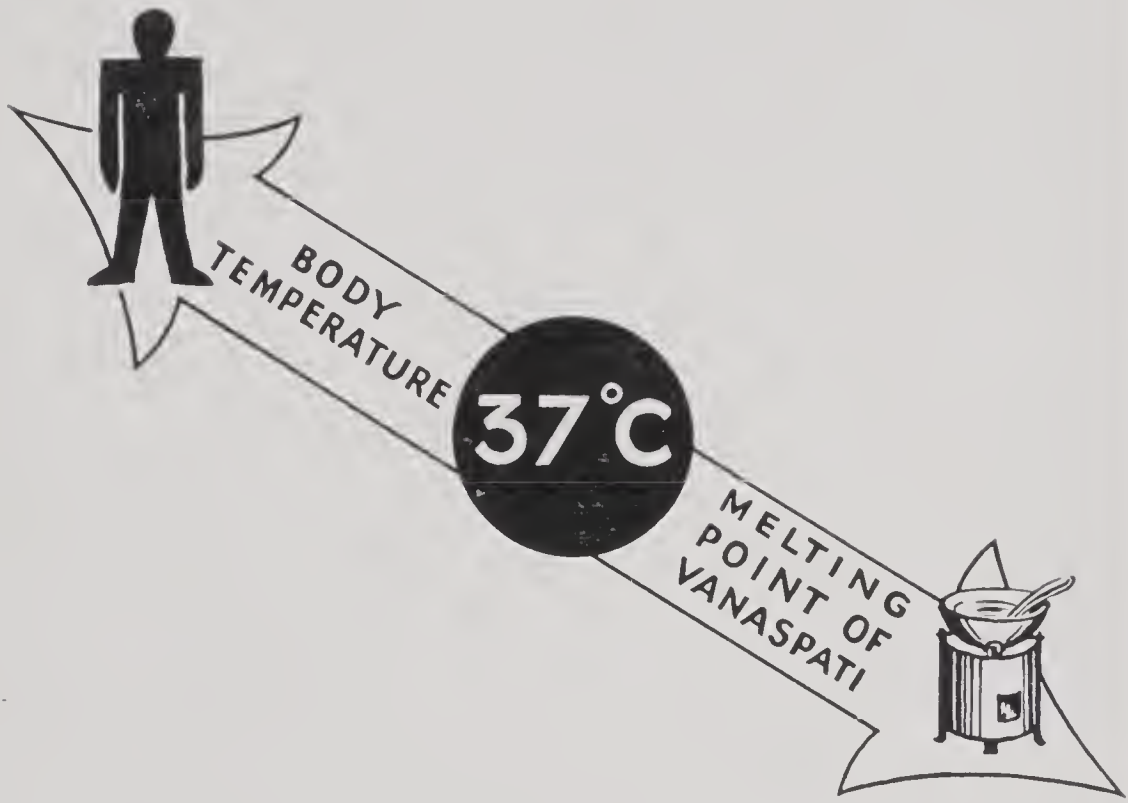
In the U.S.A., H. J. Deuel has found that Margarine fat and Shortenings composed entirely of Hydrogenated Oils have the same rate of absorption as butter-fat and lard.

The rate of absorption of ghee, liquid and hardened groundnut oil has been studied on human subjects by N. C. Nhavi and V. N. Patwardhan in Bombay. These workers have found, that although butter-fat (ghee) is absorbed more quickly than vegetable oils, hydrogenation does not reduce the rate of absorption. From this it may be inferred that an oil, which is absorbed slowly but nevertheless thoroughly, can sustain the energy of an individual for a longer time than one which is absorbed rapidly. While on this subject, it may be mentioned that *Vanaspati has a higher calorific or energy value than butter-fat.*

Melting Point: Another criticism against Vanaspati, intimately connected with the one referred to above, concerns its melting point. It is contended that the hydrogenation of Vanaspati confers on it a melting point so high that its digestibility must be impaired. The digestibility of hydrogenated oil, as has already been indicated on the authority of Langworthy and Roy, declines only when the fat approaches a melting point of over 45°C. But however that may be, *the Government of India has drawn up a specification for Vanaspati which fixes the range of melting points of Vanaspati between 31°C and 37°C only.*

The maximum melting point of 37°C fixed by the Government of India approximates of course to the temperature of the human

body. In this connection a comparison of the melting points of Vanaspati and ghee is illuminating. Dr. Godbole and Dr. Sadgopal of the Benares Hindu University have determined the melting points of large numbers of samples of cow and buffalo ghee and have found that the melting point of cow ghee varies from 28.5°C to 42°C and that of buffalo ghee from 32°C to 43.5°C.



It is clear therefore that from the point of view of melting points Vanaspati is practically at par with ghee, with the added advantage — if it is an advantage — that its melting point does not exceed the body temperature (37°C), which ghee sometimes does.

Nickel Content: A further criticism now often levelled against Vanaspati is that it contains nickel. This unfounded allegation is due to the fact that nickel is used as a catalytic agent in hydrogenation.

In the first place, although a very small quantity of nickel is employed in bringing about the chemical reactions involved in hydrogenating liquid oil, it is, under modern refining methods, completely removed after fulfilling its function. *Vanaspati is therefore completely free from nickel.*

In the second place, even if nickel from the catalyst were present in Vanaspati, it would do no harm. This aspect of the question was studied extensively in Europe and it has been found that human beings can absorb and excrete relatively large quantities of nickel without any ill-effects resulting therefrom.

It would come as a shock to those critics of Vanaspati, who are inclined to condemn it on the fanciful ground that it contains nickel, that many vegetables commonly used in the kitchen such as carrots, onions, tomatoes, lettuce etc.—as frequently also food which has been cooked in nickel vessels — contain much larger quantities of nickel than is ever likely to be found in Vanaspati.

Fatty Acids: It has been stated in certain quarters that hydrogenation produces in oil certain fatty acids, called iso-oleic acids, which are not commonly found in nature and which are therefore presumed to be harmful. There is no evidence to justify such a conclusion. Two workers in Holland, Boer and Janssen, have, on the contrary, discovered that summer butter — summer is the best season for butter in Europe — contains iso-oleic acid and, what is more, have ascertained that this acid is one of the factors in butter-fat which is essential to normal growth.

Growth and Reproduction under Laboratory Conditions: One of the latest misconceptions about Vanaspati is that it tends to develop pathological symptoms in rats after the third generation. This misconception has arisen from a preliminary report on the feeding of Vanaspati to rats, to which the Hon'ble Food Member recently gave currency in the Council of State. It is unfortunate that the Hon'ble Food Member should have given publicity to a report which has neither been completed nor published. However, on the basis of other experiments conducted in India and in other countries, there is every reason to believe that the unfavourable results of the preliminary report in question were due to a faulty basal diet and therefore entirely unconnected with Vanaspati. For example, Deuel and co-workers have found that if lactose (milk-sugar) is the sole source of carbo-hydrate in the diet, then rats will eventually die irrespective of the nature of the dietary fat. Again, Eleanor D. Mason and co-workers of the Women's Christian College, Madras, have in experiments found that, when rats were fed on a South Indian poor rice diet, the addition of butter-fat to the diet actually inhibited the growth of the rats to a degree directly proportional to the amount of butter given. What is of interest to note is that rats have thrived for 15 generations — equivalent to 450 years of human life — on an adequate diet in which the fat consisted almost entirely of hydrogenated vegetable oil. What is more interesting is that the growth rate of these rats exceeded that of the rats fed on the stock diet and progressively improved with the later generations! This experiment was conducted in the U.S.A. by Deuel and co-workers.

Lastly, it would be as well to refer here to the general argument, advanced in certain critical circles, that hydrogenated oils are in some vague and unspecified way inferior to natural fats or vegetable oils as human food. It is true that very little scientific work on this subject has been done in India, but, as has already been stated, a large amount of work on the food value of hydrogenated

oils has been carried out in Europe and the United States, and the results published. A summary of the work in the United States was recently written by H. J. Deuel of the University of Southern California. Deuel shows that with regard to the promotion of growth, fertility, lactation and in general nutritive value, hydrogenated oils used in margarines and shortenings are equal to natural oils and butter-fat and in certain directions they are even superior.

It is nevertheless true that much work remains to be done on the study of the nutritive value of oils and fats. It is to be hoped that in future more of this work will be done in India. The recent decision of the Vanaspati Industry to encourage general research through the founding, initially, of Research Fellowships and, eventually, of a Faculty for Oilseeds, Oils and Fats at a recognised University or a Scientific Institute is a step in the right direction. So also is the recent appointment by the Government of India of a Special Committee to conduct "a concerted programme of research work" on the food value of Vanaspati.

But however that may be, there can be no doubt that *sufficient evidence has already been accumulated throughout the world to demonstrate the high nutritive value of hydrogenated oils which of course include Vanaspati.*

CONCLUSION :

Interest in the food value of Vanaspati would be a welcome feature, if it were indicative of growing familiarity by the public with the science of nutrition. Unfortunately, the real issue has been obscured by the fact that most of the criticism, that has been appearing against Vanaspati in a section of the press, is ill-informed and prejudiced and seldom motivated by a desire to disseminate knowledge about nutrition or to safeguard or improve the health of the nation.

The Vanaspati Industry is fully alive to its responsibilities as a manufacturer of an article of food. In addition to keeping closely in touch with research on hydrogenated oils in other countries, the Industry carries on constant research of its own with a view to improving, if possible, the nutritional qualities of its product.

The recent decision of the Industry to found initially Research Fellowships and eventually a Research Faculty for Oilseeds, Oils and Fats at a recognised University or a Scientific Institute is convincing proof of its major concern with the improvement of the fat resources of the country.

In a practical way, the Industry has, by placing Vanaspati on the market at approximately one third of the price of ghee, already succeeded in bringing a hygienically prepared, highly nutritive and palatable cooking medium within the reach of a large section of the population.

Furthermore, by packing its products in attractive, clean and hermetically sealed containers of sizes to suit the small and large consumer, the Vanaspati Industry has given the lead to allied food industries, and particularly to the ghee industry, in the only way in which an important article of food should be marketed under the varied and generally trying climatic conditions in India.

The aim of the Vanaspati Industry is to place Vanaspati in the dietary of the people of India on the same level as that which Margarine occupies in the dietary of the people of Europe and America.

The expansion of the Vanaspati Industry, as has been shown, will no more retard the progress of the ghee industry in India than the expansion of the Margarine Industry elsewhere has retarded the progress of the Butter Industry. The experience in Europe has, on the contrary, been that with the increased consumption of Margarine, the consumption of butter had increased.

S. Sundaram
S. Sundaram

There is no logical reason why it should be different in Ind
What is more, there is no logical reason why crores of peo
in India, who cannot afford to buy ghee, should be perpetually co
demned to the use of crude vegetable oils when Vanaspati, wh
greatly improving the scope of the oil industry and without affe
ing the interest of the ghee industry, offers a more palatable, m
hygienic and an equally nourishing alternative.

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